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JEAN R. PACKARD	1	Bali Parks Congress Asks Worldwide Action Plan
DIANE WEYER	5	Half Moon Caye: Central America's First Marine Park
WILLIAM E. HAMMITT	8	Alternatives to Banning Campfires
R. GERALD WRIGHT	10	Problems of Natural Resource Management at Small Historic Sites
SANAT K. DHUNGEL	13	Conservation Education in Nepal
	15	PARK TECHNIQUES
MARK N. BOULTON	15	Audiovisual Techniques for Conservation
	19	Small Hydroelectric Turbine
J. C. McBRIDE and R. E. LEONARD	20	A System for Measuring Groundcover Changes
	21	BOOKS & NOTICES
	23	PARK VIEWPOINT
RAYMOND F. DASMANN	23	Toward a Dynamic Balance of Man and Nature—The Need for New Life Styles

Front cover: The red-footed booby (Sula sula) *of Belize's Half Moon Caye dominates the tiny island and its protection is one of the reasons the Caye has become the first marine park in Central America. The booby has a bare blue face, pink and blue bill, and white plumage with gold highlights and black wing edges. Its feet are scarlet, of course. Elsewhere in the Caribbean, except for one small colony, these birds retain the dull brown plumage colors of their immature period. Boobies nest in the low tangled forest on the island. Photo: Anne LaBastille*

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Jean R. Packard

Bali Parks Congress Asks Worldwide Action Plan

More than 450 park and protected area specialists from 68 countries called for global action to save the world's remaining natural areas at the 3rd World National Parks Congress in Bali, Indonesia, in October.

The Bali Declaration, linking conservation with sustainable development and the rational use of the world's natural resources, states:

"Earth is the only place in the universe known to sustain life, yet as species are lost and ecosystems degraded its capacity to do so is rapidly reduced, because of rising populations, excessive consumption and misuse of natural resources, pollution, careless development, and failure to establish an appropriate economic order among people and among States. The benefits of nature and living resources that will be enjoyed by future generations will be determined by the decisions of today. Ours may be the last generation able to choose large natural areas to protect."

Noting that protected areas are an indispensable element of living resource conservation, the Bali Declaration declared the following actions as fundamental:

1. Expand and strengthen the global and regional networks of national parks and other protected areas to give lasting security to: representative and unique ecosystems; as full a range as possible of Earth's biotic diversity including wild genetic resources; natural areas important for scientific research; natural areas of spiritual and cultural value.
2. Support the establishment and management of protected areas through national commitment and international development assistance.
3. Provide permanent status for protected areas in legislation securing their objectives against compromise.
4. Plan and manage protected areas using the best available scientific information; increase scientific knowledge through research and monitoring programmes; and make it readily available to scientists, managers, and the general public throughout the world.
5. Recognize the economic, cultural, and political contexts of protected areas; increase local support for protected areas through such measures as education, revenue sharing, participation in decisions, complementary development schemes adjacent to the protected area, and, where compatible with the protected area's objectives, access to resources.
6. Implement fully the existing international conventions concerning

The World National Parks Congress in plenary session.

protected areas, and adopt such new conventions as may be required.

The Bali Declaration continues: "We pledge ourselves to these actions as a contribution to sustainable development and hence to the spiritual and material welfare of all people; and

"Call upon all governments, singly and collectively, to take these measures with due dispatch, bearing in mind their responsibility for the whole of life and their accountability to present and future generations."

Dr. Lee M. Talbot, Director General of IUCN, highlighted the importance of the World National Parks Congress in his closing remarks:

"The Congress has represented a major advance over the previous two meetings. But it is a progression from them, building upon the foundation they laid and affirming it, not replacing it or changing it. The IUCN categories of protected areas have been basic to our discussions . . . their validity has been strongly affirmed.

". . . The role of protected areas as an essential component of the development process has been firmly established. But let there be no question about this basic concept. By development we mean sustainable development . . . activities which bring solid and lasting contributions to human welfare. We do not mean development . . . which may bring short term economic gain to some at the expense of long term stability or of the ecological and, often, social systems. And we do not mean inappropriate development . . . which would destroy the very values for which the (protected) areas were established.

". . . protected areas should be created and maintained in the context of the process of sustainable development. They are and must be seen to be essential contributions to, indeed foundations of, the process which brings lasting benefits to the peoples of a nation and the world. Protected areas are protected *for* people, not *from* people."

Progress in the Last Decade

There has been considerable progress in the establishment of protected areas since the 1972 World National Parks Conference. During the past ten years the total number of areas rose from 1,584 to 2,307, and the area protected increased from 212 million to 386 million hectares. There are now 2,611 conservation areas in 124 countries on the United Nations List of National Parks and Equivalent Reserves.

In his address officially opening the Congress, Indonesian Vice President Adam Malik emphasized the developing nations' commitment to the environment. "The center of gravity is now in the Third World," he said, referring to the evolution of parks management policy. "Over the past ten years, more national parks have been established in the Third World than anywhere else."

Continuing this trend, the Indonesian Minister of Forestry announced creation of 11 new national parks in that country, totalling 2,250,377 hectares. These join the existing five national parks, making a grand total of 4,935,966 hectares. Taken as a whole, Indonesia has set aside 299 protected areas, or about 6 percent of the country's land area.

During this Congress protected area managers, scientists, planners and supporters from around the world delineated and wrestled with the concept of conservation within a framework of sustainable development. In many parts of the world local people resent parks; indifference or misunderstanding results in irreversible damage; subsistence requirements for food and fuel force destruction at an ever-increasing rate. In Asia, for example, protected areas are becoming green enclaves in an otherwise denuded landscape. According to FAO, approximately 5 million hectares of forests are lost annually in Asia as the population continues to increase. Throughout the world increasing social and economic pressures make designation of new areas difficult and strain the resources to protect those already established.

While pointing out these problems, however, the speakers and the many papers submitted were confident that the coming years would enhance and enlarge the world's protected area. Many recounted the positive activities of their own and neighboring nations to protect and expand the remaining natural areas of the world, to train their management personnel, and to educate governmental officials and the public as to the importance of parks and reserves.

During the past decade the total number of natural areas brought under protection climbed from 1584 to 2307, and the total area rose from 212 million ha to 386 million ha. Dr. M.D.F. Udvardy makes a point at the world map.

The manner in which different countries are attempting to solve the sometimes conflicting aims was one of the major themes of the Congress. The traditional protection of nature is more important than ever, they stressed, but there are many additional ways that conservation benefits can be produced.

Maintaining the diversity of the earth's genetic resources by preserving the habitats that support different species of plants and animals is one major goal. Modern agriculture is highly productive largely because of the development of specialized varieties of plants and animals. Almost every coffee tree in Brazil is descended from a single plant; the entire U.S. soybean industry is derived from only six plants from one place in Asia; only four varieties of wheat produce 75 percent of the Canadian crop. New varieties can only be developed by cross-breeding, often with wild relatives of domestic plants. It is precisely these plant varieties, known and undiscovered, which are threatened by the growing human pressure on the earth's wild places.

Action Plan

Dr. Kenton Miller, co-Secretary-General of the Congress, outlined an action plan calling for commitment to future generations "that they shall inherit this unique, small and fragile planet rich in options for their destiny." His proposal:

1. Establish a worldwide network of national parks and protected areas to cover 10 percent of all terrestrial ecological regions.
2. Incorporate marine, coastal and freshwater protected areas into the worldwide network.
3. Evaluate the biological and managerial quality of existing protected areas.
4. Develop the full range of wildlife management categories.
5. Promote the linkages between protected area management and sustainable development.
6. Develop the full capacity to manage protected areas.
7. Develop economic tools for protected areas.
8. Implement an effective inventory and monitoring service.

The Congress sessions were divided according to the eight biogeog-

raphic realms, featuring a keynote address by a conservation leader from the area, a series of case studies dealing with specific problems or concerns of protected areas within that realm, and a "future directions" paper outlining the projected trends and suggesting possible new approaches for the next decade. More than 100 papers were presented on all aspects of the evolving role of protected areas in meeting the needs of society.

Three days were devoted to workshops dealing with preparing tools for the man in the field, and will result in three handbooks for protected area managers. Twelve workshop sessions were devoted to each of three broad topics: managing protected areas in the tropics; managing coastal and marine protected areas; and training protected area personnel. These 36 sessions dealt with a specific set of principles and developed guidelines for their application. Conceptual background papers were developed for many of these sessions, in addition to case studies presented to the plenary session.

Recommendations

The Congress issued 20 recommendations to provide a basis for implementing the intent of the Bali Declaration. These included:

1. Information on protected areas — stresses importance of adequate programs for research and the recording and monitoring of information; urges long-term development and use of data collection systems, and wide dissemination of information to protected area managers.

2. Global system of representative terrestrial protected areas — calls attention of governments to especially critical situations in tropical forests, drylands, wetlands, and tundra.

3. Marine and coastal protected areas — recommends that coastal nations declare territorial seas and other areas, including islands, as managed areas; adhere to the Convention on the Law of the Sea; increase marine research programmes. Calls upon IUCN to develop an appropriate marine biogeographic classification, develop training and education programs.

4. Antarctica — recommends Antarctic Treaty parties maintain the intrinsic values of the Antarctic environment, ensure human activities are compatible with those values, and ascribe to the area an internationally protected area designation; urges that no minerals regime be brought into operation until full consideration has been given to protecting the environment.

5. The role of protected areas in sustainable development — urges nations to make fullest use of the range of protected area categories recommended by IUCN; reaffirms that national parks and similar reserves must be strictly protected against exploitation; urges more multiple use management areas around stricter nature reserves; calls for intensive research on the degree to which gene stocks from national parks ought to be made available, on ways to manage tropical forests in multiple use management areas, and to facilitate better understanding of the role of parks in serving human needs.

6. Threats to protected areas — calls on governments to initiate measures of sustainable social and economic development which will relieve pressure of local populations around protected areas; urges development of appropriate legislative and administrative mechanisms; abandonment of projects with unacceptable environmental impacts; implementation of effective measures to eliminate and avoid all forms of pollution which degrade protected areas.

7. Combating poaching — recommends strengthening anti-poaching programs and related training of field staff; adequate funds be made available to better the field staff support; tangible benefits should accrue to local people living near protected areas, where possible.

8. Environmental planning and protected areas — urges governments to integrate conservation principles with development planning, to promote and support rehabilitation of degraded lands and damaged natural areas.

9. Protected areas and traditional societies — reaffirms the right of traditional people to self-determination, participation in decisions affecting the land and natural resources on which they depend; recommends joint management arrangements whenever possible.

10. Conservation of wild genetic resources — urges establishment of *in situ* gene banks, with international governmental and non-governmental assistance.

11. Development assistance and protected areas — urges multilateral and bilateral assistance agencies to recognize that protected areas are an indispensable part of sustainable development, and to support no projects which would adversely impact strictly protected areas.

12. Management of protected areas — urges governments to identify resources in protected areas, prepare management plans, involve local communities in preparation and implementation of plans, provide adequate staff and finance to implement management plans, and require government agencies and private interests to coordinate their activities with the protected area management.

13. Protected area personnel: training and communication — urges continued support for the International Seminar on National Parks and Equivalent Reserves and other regional and national training programmes; urges IUCN to publish PARKS Magazine in three languages and to assume greater responsibility for its publication and distribution; urges IUCN to work toward establishing an organization of those involved or interested in parks and protected areas based on personal membership for whom PARKS Magazine could serve as a channel of information.

14. Development of public support for protected areas — urges governments and relevant agencies to develop interpretation and environmental education programs, encourage young people to undertake environmental studies, facilitate greater use of mass media, provide appropriate assistance to voluntary conservation organizations for programs to enlist public support for protected areas.

15. Voluntary assistance for protected areas — urges governments and agencies to take advantage of volunteer assistance and, where possible, give them necessary financial support.

16. World Heritage Convention — urges all States to become party to the Convention, urges natural heritage authorities to become more active in its affairs, urges Unesco to consider launching international campaign

Reuben Olembo, UNEP official, addresses one of the plenary sessions at the Bali Beach Hotel.

Recipient countries benefitting from international cooperation projects expressed their views in one of the interesting panel discussions. Left to right, Roger Morales, Costa Rica; Dr. Marc Dourojeanni, Peru; Albert Mongi, Tanzania; Hermantra Mishra, Nepal, and Birendra Singh, Fiji.

for natural sites.

17. Biosphere reserves — recommends Unesco promote an improved understanding of biosphere reserves; urges governments and international organizations to give priority to establishing a network of reserves, with particular effort where human pressures have made it difficult to conserve genetic resources.

18. International agreements and protected areas—call on all States to become parties to global and appropriate regional conventions supporting protected areas.

Management of the Congress was shared by the co-sponsors, IUCN and Indonesia. Co-Secretaries-General were Dr. Kenton R. Miller, CNPPA Chairman, and Wartono Kadri, Director of the Directorate of Nature Conservation (PPA).

19. Future World Congresses — recommends consideration of meeting more frequently; suggests consideration of holding 1992 World Parks Congress in the Neotropical Realm, coinciding with the 500th anniversary of Columbus' voyage to the Americas.

20. Expression of thanks — to the government and people of Indonesia and Bali for their generous hospitality.

Closing ceremonies of the third World National Parks Congress included awards to protected area specialists for valor and for long and distinguished service.

Recipients of the Fred M. Packard International Parks Merit Award were:

Sgt. Maj. Peter Logwe, Kidepo Valley National Park, Uganda
Symed Ahmed and Fateh Singh Rathore, Ranthambhor Tiger Reserve, India
The Kepala Sub-Balai of Indonesia
Sylvanus Gorio, Papua New Guinea National Parks Board
James Peter Stantion, National Parks and Wildlife Service, Queensland, Australia
Dr. Jose Rafael Garcia, Director of National Parks Directorate, Venezuela

Recipients of the World National Parks Congress 1982 special awards for long and distinguished service:

Myles J. Dunphy, Australia
Sir Charles G. Connell, Scotland
Dr. George Ruhle, United States
Fergus Lothian, Canada

In "recognition of their outstanding international service to national parks" the World National Parks Congress presented four special acknowledgement plaques. Recipients were: Fred M. Packard (USA, in memoriam), Robert I. Standish (USA), Prof. Jean-Paul Harroy (Belgium), and Dr. Soedjarwo, the Indonesian Director-General of Forestry and his staff.

Jean R. Packard is Associate Editor of PARKS Magazine. She served as Documents Officer of the Bali Congress and also for the First and Second World Parks Conferences.

Diane Weyer

Half Moon Caye: Central America's First Marine Park

The sea has been deep blue for several hours, ever since the boat passed over the edge of the barrier reef and the seabed dropped 6,000 feet (1829 m). The porpoises and the flying fish disappeared an hour ago. Just as you begin to think there is never going to be anything but blue in sight, the water turns turquoise again as you cross part of the atoll reef and there are two smudges on the horizon. . . distant islands. A huge eagle ray erupts as the shadow of the boat looms above it. In the depths you can just see isolated clumps of coral against the sand. When you finally look up, you find you've passed by one island and the other lies straight ahead—the "jewel gently washed by the Caribbean" that travel brochures advertise. But this island isn't buried under high-rise hotels and condominiums. Half Moon Caye looks pretty much as it has for the last thousand years. Hurricanes have blown down the trees from time to time but they've grown back. About 150 years ago someone added a lighthouse. It's still there. So are the coconut palms and the white sand. And the birds! The red-footed booby birds, the reason this particular island is the nucleus of the first marine park in Central America.

Once you've seen a couple of thousand booby birds crowding every available tree and shrub on the western side of the island with their haphazard nests, it's hard to think of the island as belonging to anyone else, but legally Half Moon Caye is part of Belize, a small, newly independent country which lies 60 miles to the west, across miles of open ocean and behind the second-longest barrier reef in the world. Belize is a country of contrasts: dense jungle, open savannas, caves and huge lagoons where hundreds of thousands of waterbirds congregate in the dry season; jaguars and mountain lions, tapirs and white-tailed deer, parrots and snail kites; where northern species moving south overlap with southern species moving north.

Belize's cultural heritage is equally varied; African slaves, English pirates, Scots loggers, Spanish conquistadores, Indian farmers (descendents of the great Mayan Empire) and, more recently, East Indian and Chinese traders, have all contributed to the population. Founded as the colony of British Honduras in 1862, it became the independent country of Belize in September 1981. One of the first things Belize's new government did was to make Half Moon Caye and its surrounding reef and lagoon area, totalling 15.75 square miles (40.8 km^2), a Natural Monument. As I write this in September 1982, the last preparations for the celebration of Belize's first year of independence are being completed and the future looks good.

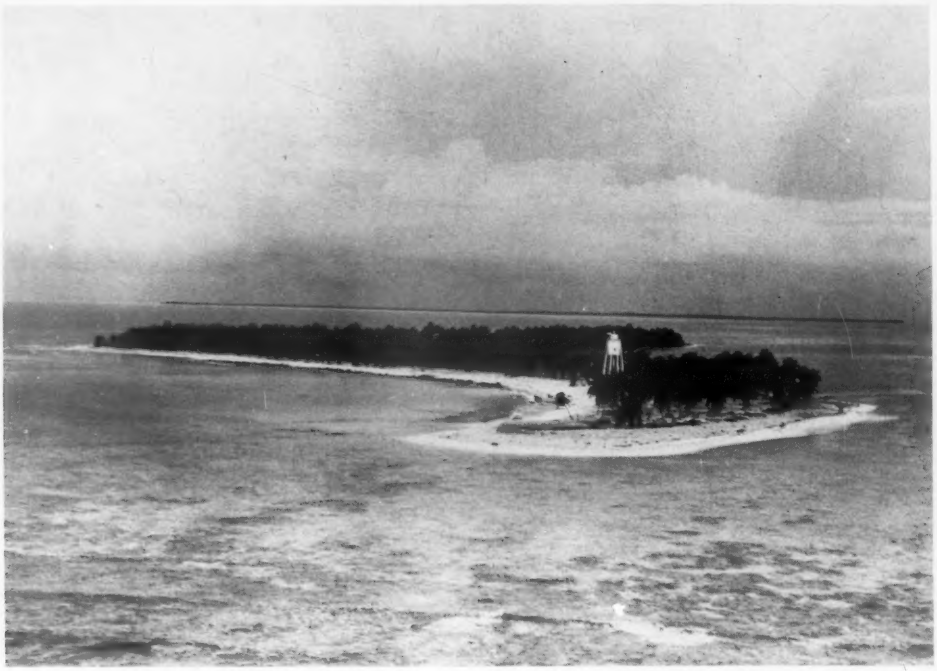
The colony of red-footed boobies *(Sula sula)* has been known to exist for over a hundred years. The nesting area was made a Crown Reserve in 1928 and the red-footed booby was added to the list of protected animals in 1950. In 1979 the government, at the urging of the Belize Audubon Society, decided the caye should become a Natural Monument when enabling legislation could be passed. Meanwhile, the government and the Belize Audubon Society spent $15,000 ($7,500 U.S.) to purchase those sections of the island that still remained in private hands, the government contributing half and the other half raised by the Society, primarily through Dr. Craig MacFarland of C.A.T.I.E. and Dr. Tom Lovejoy of W.W.F.-U.S. In November 1981, Minister Marin of the Ministry of Natural Resources formally proposed that Half Moon Caye be made a Natural Monument, the necessary legislation having been passed earlier in the same month, and in March 1982 it became so officially, to be cared for by the Belize Audubon Society.

Half Moon Caye itself is approximately 45 acres (18.2 ha) in size and is divided into two very distinct ecosystems with little transition zone between them. The eastern half is composed primarily of coconut palms with sparse ground level and littoral vegetation. The western half is covered in siricote *(Cordia sebestena)* forest, which is the normal climax forest for sand cayes in this region. Along with the orange-flowered siricote, figs (*Ficus* sps.), gumbo limbo *(Bursera simaruba)* with its soft red bark, and various vines and shrubs form an extremely dense tangle of vegetation that is bordered by a rich littoral fringe dominated by *Tournefortia* sp. and spider lilies *(Hymenocallis littoralis)*.

The low siricote forest is the home of the booby birds, which live there for nearly 10 months of the year. The boobies, which use the same nests year after year, start refurbishing them in November. Eggs are laid primarily in December and are incubated for 46 days by both parents. Boobies start life solid black in color but soon sprout thick, white fuzz. After about 2 months their brown immature plumage begins to grow in. Ninety eight percent of the mature adult boobies at Half Moon Caye are a shining white with pale gold highlights on their heads and necks and black wing edges. This elegant plumage seems incongruous on birds with bare blue faces, pink and blue bills, and scarlet feet! Only the boobies at Half Moon Caye and at a small colony off Tobago turn white as adults. Elsewhere in the Caribbean they retain the dull brown immature coloring throughout their lives.

Baby boobies remain in the nest for nearly 4 months and the parents continue to feed them for several more months after they leave the nest. That's a long time to feed growing babies, and the parents' job is made even harder by the frigate birds *(Fregata magnificens)* which also nest on Half Moon Caye. The boobies fish far out to sea, where they dive on their prey from heights of up to 100 feet or so, but when they return to their nests they are the ones who are attacked from above by aerial pirates with imposing 7-foot wingspans. Thus the poor boobies often wind up feeding not only their own hungry babies but those of the frigate birds as well! Interestingly, it is the younger booby parents which lose most to the frigate birds, the more experienced boobies flying in high above the frigates before diving steeply down to their nests.

The boobies have other enemies besides the frigate birds (which will steal eggs and nestlings as well as fish). Another natural predator, the scaly-tailed iguana *(Ctenosaura similis)*, also steals booby eggs and babies. But the biggest danger to the colony comes from the introduced black rat and from man, himself. The island was overrun with black rats



Half Moon Caye with its rich surrounding reefs and lagoon covers some 40 km². The island is covered by coconut palms and other vegetation in which boobies and frigate birds nest. The lighthouse was erected about 150 years ago.

when the Belize Audubon Society, at Dora Weyer's instigation, started a regular rat poisoning program in 1970. Each year members of the society take bait poisoned with warfarin out to the caye during November, so as to knock down the rat population before the boobies lay their eggs. The problem of man's deprivations is not so easily solved. Despite being a protected species since 1950, at least in theory, the booby colony is routinely raided each year for eggs by local fishermen. The Belize Audubon Society, with the help of the lighthouse keepers who were made provisional wardens, has tried to stop this illegal activity but poaching is not an easy problem to solve anywhere, let alone on an isolated island 60 miles off the coast. The situation has gradually improved but poaching still occurs from time to time. As the fame of the booby colony has spread, too many uncontrolled visitors to the island and its rich surrounding waters are creating problems of over use and abuse which the Society is currently attempting to deal with.

Somehow, despite their name having derived from their apparent inability to learn that humans, particularly sailors hungry for fresh meat, were a source of danger, the boobies at Half Moon Caye have survived for at least a hundred years though the size of the colony has varied considerably. Salvin, one of the first naturalists to study wildlife in Central America, visited the caye in 1862 and wrote of "certainly several thousands" of boobies present then. J. Verner in 1958 counted 1,389 nests and estimated a population of around 3,000 adults and 500 immatures, exclusive of nestlings. Then Hurricane Hattie decimated Half Moon Caye along with much of the rest of Belize in 1961, flattening the siricote forest and killing most of the birds. Rats and human thieves kept the colony from recovering for many years. Belize Audubon Society protection gradually improved the situation until in 1978 students from Goshen College (USA) assisting the society were able to count 1,329 active nests.

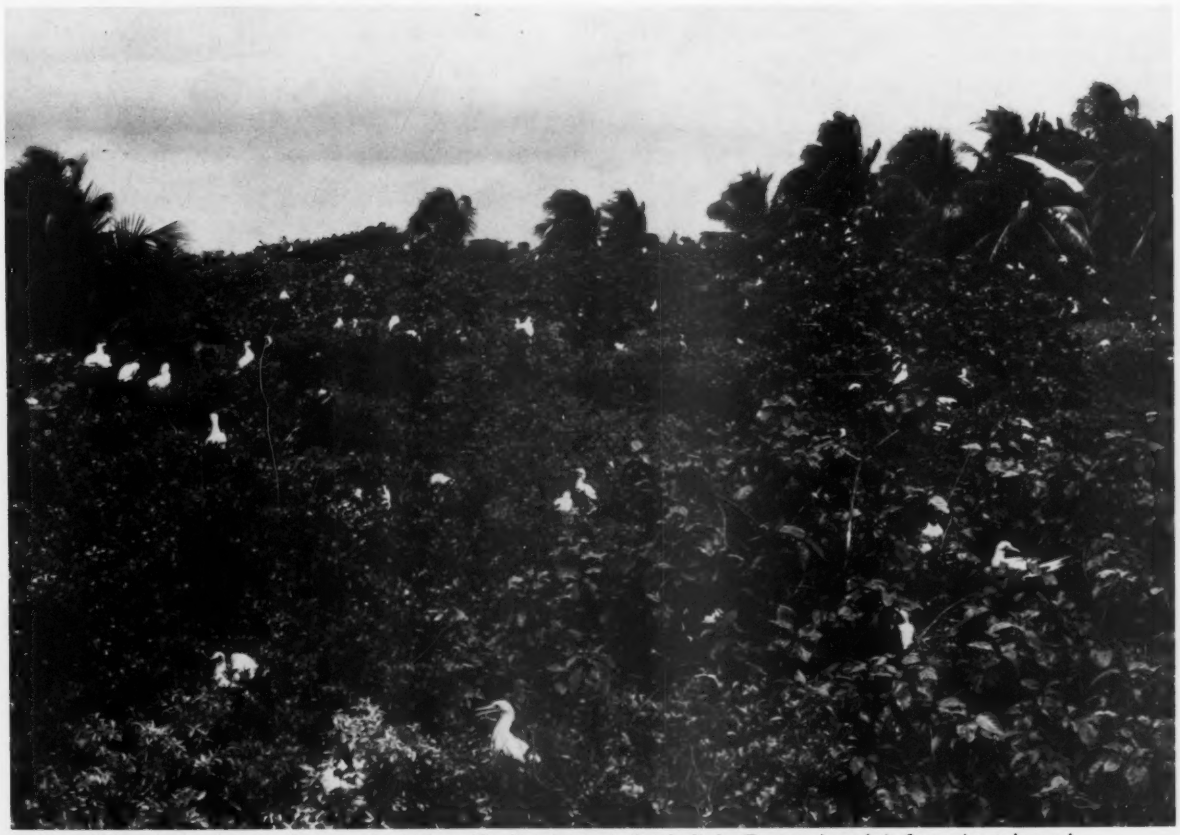
Though Half Moon Caye would never have become Central America's first marine park without its boobies, it is much more than a bird colony. The caye itself is home to a host of other creatures including an endemic species of anole lizard *(Anolis allison)*. Ninety-eight species of birds have been recorded on the caye so far, including a pair of ospreys that nest there each year. Loggerhead turtles *(Caretta caretta)* come ashore in twos and threes to lay their eggs on the sandy eastern beach. And stretching

One of the richest reef systems in the tropical Caribbean is associated with Half Moon Caye. Its clear waters and abundant species make it very attractive to scuba divers. All photos: Anne LaBastille

Wreck of a British freighter, aground on a reef for several decades, is part of the scenery at Half Moon Caye.

away from the caye to the east and south are miles of atoll reef where elkhorn, brain and staghorn corals create a background for one of the richest ecosystems in the world. Inside the reef lies a shallow lagoon where turtle grass alternates with patch coral and open sand, an estimated 10 percent of the sand being produced by the thousands of flamboyant parrot fish (*Sparisomidae* sps.) as a by-product after chewing up chunks of coral to extract the algae found in the polyps. Surgeon fish, damselfish, grouper, butterfly fish and a hundred others, lobster, conch, helmet shells, starfish and brittlestars, sea urchins . . . to list all the creatures that dwell within the confines of Half Moon Caye Natural Monument would fill many pages. In this instance it is best to just be glad it exists and is protected, now and, hopefully, forever.

Diane Weyer, a naturalist, tour guide and writer, has been working on conservation problems with the Belize Audubon Society for the last decade. She is a member of the Society's Board of Directors. Born in the USA in 1949, she grew up in Liberia and moved to Belize with her parents in 1966. She has been a permanent resident of Belize since 1971.



Booby and frigate bird rookery in a dense tangle of siricote (Cordia sebestena), *Gumbo limbo* (Bursera simaruba), *fig species, palms and other plants.*

William E. Hammitt

Alternatives to Banning Campfires

U.S. National Park Service policy provides for the preservation and conservation, and restoration when necessary, of park resources. Equally important, it provides for public enjoyment of these same resources. This dual policy of preservation and use often leads to conflict for park resource managers. Many public uses of park lands cause ecological and physical disturbances that are unacceptable to the preservation policy of management. When unacceptable levels of resource disturbance occur, managers often respond by restricting use of park resources.

Such is the case with the use of campfires in backcountry areas by overnight campers. Disturbances resulting from backcountry campfires include: excessive down-wood removal, live tree removal, mechanical damage to living trees, and uncontained fires. Visual and social impacts also result from the presence of fire scars and fire rings. Some park and wilderness managers have responded to these impacts by severely restricting, and in some cases eliminating, the use of campfires by campers. For example, Shenandoah National Park has banned campfires from its backcountry, and Great Smoky Mountains National Park has contemplated the idea. While park managers feel this action is necessary to protect park resources, the action also eliminates a very important aspect of the camping experience. Because the campfire is an important aspect of camping experiences, this paper examines various alternatives to the complete banning of campfires that should be considered by management.

The proposed framework of campfire management alternatives is based on the philosophy that management should provide for a "spectrum of user, and management opportunities" when possible, rather than resorting to an "all or none" policy toward management decisions. While the only alternative to management might be the elimination of backcountry campfires, this decision should be arrived at only after considering less restrictive alternatives that preserve both user experiences and park resources at acceptable levels.

Campfire Management Alternatives

The alternatives for managing the use of campfires in backcountry recreation areas are selected from those which are most *indirect* in controlling user opportunities to experience campfires to those which are most *direct* at controlling user opportunities. This scheme follows the proposed philosophy of providing park users with as much of a "spectrum of campfire opportunities" as possible while still attempting to preserve park resources (Table 1).

Information Programs—The most indirect of the management alternatives is the provision of information to park users about impacts of the campfire and its proper use. Many parks are already using this alternative through interpretive programs and backcountry use brochures. The objective is not to restrict user behavior, but to modify it. Information to educate users on campfire impacts, on minimum impact camping, on park policy on the use of campfires and resource preservation, and about underused areas where campfire impacts are low, may modify user be-

Table 1. *Alternatives for managing the use of campfires in backcountry recreation areas.*

Type of Management	Alternative	Specific Examples
INDIRECT (Emphasizes modifying user behavior; preserving campfire opportunities)	Information Programs	Promote desired campfire policies. Educate users of campfire impacts. Redistribute users to underused areas or more tolerant sites.
	Alternative Fuels	Encourage use of lightweight stoves, lanterns, and alternative fuels.
DIRECT (Emphasizes regulation of user; removal of opportunities)	Elevational Zoning	Restrict fires above treeline and in adjacent high elevation plant communities.
	Forest Type & Site Zoning	Restrict fires from forest types that lack fuelwood (i.e. spruce-fir forest). Restrict fires from non-forested areas (i.e. grassy balds, beech gaps). Restrict fires by specific sites that lack fuelwood or present a fire danger.
	Temporal Zoning	Restrict fires to hours of darkness only. (Require stoves for cooking).
	Seasonal Zoning	Restrict fires to winter and cool weather seasons.
	Communal Fires	Require several parties to share a common fire.
	Rationing	Ration campfires to ½ or ⅓ of the nights camped by a party.
	Total Ban	Eliminate fires on a park wide basis.

havior to a degree that campfire impacts are greatly reduced.

Alternative Fuels — Closely related to information dispersal is the encouraged use of alternative fuels. By informing campers of the advantages of lightweight stoves for backpacking, campers may choose to use fewer open fires.

The use of lightweight lanterns as a substitute for the esthetic campfire might also be encouraged.

Elevational Zoning — As a more direct alternative to campfire management, the manager may want to restrict the use of campfires above certain elevations in mountainous parks. The lack of fuelwood above treeline and in adjacent alpine to sub-alpine plant communities may eliminate the use of campfires in these areas. The very short growing season and slow rate of plant growth at these elevations can not produce the fuelwood necessary for campfires.

Forest Type and Site Zoning — As an extension of the elevational zoning alternative, certain forest types and non-forested areas of a park may need to be zoned as non-campfire camping areas. Some forest types (ie. spruce-fir) may not have a high enough rate of fuelwood turnover to supply the fuelwood needs of campers. Grassy balds and beech gaps are additional plant communities where fuelwood production is quite low. The alternative also applies to specific sites or use locations where previous heavy use has eliminated the nearby fuelwood source or where forest fire dangers occur during fire seasons.

Temporal Zoning—The philosophy behind this alternative is to limit campfires to an esthetic function to occur only after dark. Many backcountry users are already using lightweight stoves for their cooking. The stoves are more dependable and efficient than campfires for cooking. However, the presence of a stove does not eliminate the need for campfires. Most campers still consider the fire to be an important esthetic and emotional component of the camping experience. By requiring campers to use stoves for their cooking and to build campfires only after dark, far less fuelwood would be used. Instead of three campfires per day (breakfast, lunch, dinner) or, as sometimes occurs, the all day cooking fire, the campfire would be limited to a few hours of darkness during the typical summer camping evening. Such an alternative may reduce the demand on fuelwood to the extent that the forest could meet the needs of campers, and greatly reduce campfire impacts.

Seasonal Zoning—A further restriction on campfire use would be the restricting of its use to winter and cool season camping. Fuel for heat and comfort is needed during these seasons, yet the demand would likely be light due to fewer campers. To ban the use of campfires during all seasons of the year would serve only to discourage off-season camping. Off-season use is a concept which many parks would like to encourage.

Communal Fires—As another alternative to reducing the number of backcountry campfires and the consumption of fuelwood, the sharing of a fire by several parties is suggested. On South Manitou Island at Great Sleeping Bear National Lakeshore, Michigan, a communal campfire pit is supplied for every six to ten camping sites. Fires are prohibited except in the designated pits. The technique appears to be quite successful, with essentially no evidence of tree chopping or removal of horizontal screening vegetation within and between individual campsites. Although this alternative would not serve the needs of all types of campers (ie. those oriented to solitude), it does provide an opportunity within the spectrum of campfire alternatives where many campers would experience the campfire.

The communal fire concept deserves further adaptation to various backcountry areas. Alpine lakes and other destination areas where campers tend to concentrate would be likely areas where the communal fire alternative might be tried. Even one fire pit per four parties would serve to reduce the number of backcountry fires by 75 percent.

Rationing — This alternative addresses the question, "Do campers need a campfire every night of their camping trip?" Rather than eliminating fires from the entire camping experience, managers may want to ration fires to ⅓ or ½ of the camping nights for each party. The rationing of campfires could occur at the time hiking permits are issued, the nights being selected by users. The alternative offers the benefit of not only restricting the number of fires in the backcountry, but may also increase the quality of the campfire experiences, that is, rationing may put a greater value on the campfire experiences permitted.

Extensive campfire impacts, as illustrated in this scene, have led to the banning of campfires in some backcountry recreation areas.

Total Ban—Little explanation is needed for this alternative. However, much deliberation and thought is needed before resorting to it. Recreation resource management is based on providing a spectrum of recreational opportunities, so that the needs of a diversity of users might be met. The campfire is an important component of backcountry experience and we need to provide for its enjoyment when and where possible.

Conclusions

What has been provided is a framework or spectrum of management alternatives for managing the use of campfires in backcountry areas. The framework provides a number of alternatives—by no means all inclusive—to the ultimate policy of banning backcountry campfires on a parkwide basis. Managers are encouraged to add to or adapt the alternatives as fits their needs. Each alternative also should not be viewed as a solution in itself. Combinations of two or more of the alternatives might best fulfill management's needs.

Managers should realize that the proposed alternatives will not necessarily make their job easier when making campfire management decisions. To the contrary, it may make the job more complex. In most cases, the simplest decision would be to ban all campfires. But then, would that alternative fulfill National Park Service policy?

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R. Gerald Wright

Problems of Natural Resource Management at Small Historic Sites

There are within the U.S. National Park System, some 130 areas of less than 400 ha that were established because of a historically significant event. About 40 percent of these areas have been established in the last 25 years, often long post-dating the actual historical event. The resource management problems that these areas face are often uniquely related to their size and recent establishment. The Cooperative Park Studies Unit (CPSU) at the University of Idaho, one of three Pacific Northwest Region (NPS) university units, was established in part to deal with such problems.

Their problems are derived from the facts that:

1) They are often overshadowed in the budgetary priority process by the larger, more renowned parks;

2) Their visitor use is often low, meaning less political leverage;

3) Their resource management problems tend to be small and are viewed, often wrongly, with less concern that those encountered in larger parks;

4) They often do not have the staff and expertise to deal with the problems they face.

Investigations by the University of Idaho CPSU at several small historic areas within the Region have indicated that most are encountering resource management problems of a remarkably similar nature. One of the more common problems is the difficulty in managing their plant resources, particularly the control of exotic plants. This paper will examine this problem, its causes and effects, and use it to discuss some of the practical considerations influencing solutions to resource management problems at small parks. It will do so by focusing on three parks located in eastern Washington and western Idaho, and listed in Table 1.

Genesis of the Problem

All three parks can be broadly considered to be within the same physiographic province, the extension of the Columbian Plateau. All are part of or border on what was once an intermountain prairie system. In the eons before European man intervened, the vegetation of this intermountain region was dominated by perennial grasses, such as bluebunch wheatgrass, and was a dynamic ecosystem in balance with its environment. Woody species were limited primarily to narrow bands along the rivers where dense thickets of willows and cottonwoods were found. Unlike most natural prairies on the continent, no large native herbivores grazed the Palouse (Daubenmire 1942). The influence of man was also minor. The Indian population was never large, and their society lacked the technology to alter the vegetation. They had no domestic livestock and practiced very little crop agriculture, depending instead on a partially nomadic existence, emphasizing food gathering and salmon fisheries at various times of the year (Harris 1967).

Fire was perhaps the most important management tool of the Indians. It was used periodically to burn particular areas in order to increase the production and quality of wild forage, the accessibility to plant foods, and to facilitate hunting and travel by burning away underbrush (Shinn 1980).

The introduction of European culture into this region with its traditional use of the plow, domestic livestock, and fire control, foreshadowed the destruction of the pristine ecological balance of this intermountain prairie region forever. There was widespread destruction of the native grasslands which created the opportunity for the invasion of

Table 1. *Summary of Characteristic Sites Studied.*

Area	Size ha. (acres)	Dates of historical event	Date of NPS acquisition	Intervening land uses	Ratio between time under non-NPS and NPS management
Whitman Mission NHS Walla Walla, WA	39 (98)	1840s	1936	farm land crops, grazing, pasture	2.1
Nez Perce NHS Spalding, ID	723[a] (1836)	1850s	1965	pasture, recreation, grazing	6.8
Ft. Spokane area of Coulee Dam NRA near Davenport, WA	43 (110)	1880s	1946	pasture, health care facility	1.8

[a]Divided into some 20 different parcels.

Photos:
R. Gerald Wright

A view of the White Bird Hill battlefield which is the site of the opening engagement of the Nez Perce War photographed in June, 1977. Because of the past grazing activities, this site is dominated by annual, non-native grasses and weeds.

introduced annual weeds and grasses on a wide scale (Harris 1967). It is an interesting irony that both the missions at Waiilatpu (Whitman) and at Lapwai (Nez Perce-Spalding Site) represent some of the first settled and developed sites of European culture on the eastern edge of the Oregon Territory. They were the places where many of the land uses and agricultural changes which subsequently engulfed the region, altering the ecological balance, were first introduced. Now these areas represent (or are capable of representing with proper vegetation management) some of the last vestiges of undisturbed intermountain prairie remaining in the region.

Why have the exotic weeds and annuals been so successful in dominating the region? A number of investigations have been conducted to answer this question. One hypothesis concerns the ecological changes brought about by the introduction of domestic herbivores (Young *et al.* 1972). Originally, with the absence of native herbivores, there was little need for the evolution of plant species that were adapted to grow in the seral habitats created and maintained by grazing. The introduction of domestic livestock in the late 19th century changed the situation, eventually causing widespread destruction of native grasslands through overuse. Native grasses adapted to revegetate areas denuded of vegetation were lacking. At the same time exotic weeds and grasses, which were well developed climatically to this situation, were being accidentally introduced into the west and flourished, often reaching a point where they were able to outcompete the native grasses. Today, on many sites, non-native species introduced some 50 years ago still dominate (Daubenmire 1975).

Each of the historic sites studied here reflects the saga outlined above. Each has been subjected to a long history of different land uses and landscape disturbance. Because of this, the plant communities on all three areas outside the maintained lawns and plantings are, in general, dominated by annual grasses, e.g., the exotic cheatgrass *(Bromus tectorum)* and an abundance of exotic, often noxious, weeds. The ground cover of perennial grasses accounted for by native species is often less than 25 percent.

A list of the different uses which have occurred on the three sites prior to NPS acquisition is given in Table 1. A simple index, the ratio of the length

View of the Spalding Site, headquarters for the Nez Perce National Monument. Here in 1838 Reverend Henry Spalding built his second mission, then called Lapwai. Many ornamental non-native plantings are found throughout the site.

of time in which the sites received no formal protection, to the time under NPS management, appears to correlate well with the level of deterioration in the natural ecological communities. These ratios are calculated for each site investigated and are given in Table 1. The magnitude of these ratios appears to parallel the degree of disturbance in each area. On the other hand, similar ratios calculated for the longer established historical parks in the U. S. averaged less than one.

View of a portion of Whitman Mission showing a vegetation type characterized by native perennial grasses which probably most closely resembles pristine conditions in the area.

Problems of Exotic Plants

The problems caused by changes in plant communities and the introduction of non-native species are numerous. Introduced species are, in general, aesthetically unpleasing and, by their nature, distract from the historic scene. Spiny species such as thistles limit foot travel and access to parts of the sites. The existence of non-native species is counter to NPS policy, and is opposed by many local ordinances mandating the control of exotic and dangerous plants. Some introduced plants are dangerous, or they are poisonous to humans and grazing animals. Finally, by their very presence, the exotics prevent the re-establishment of native plant communities on the sites, and provide an abundance of seed for the spread of non-native plants to areas beyond the boundaries of the parks. A failure to control weeds on park areas often hurts relationships with surrounding land owners.

Control of non-native species is not easy, and park management policies limit vegetation control techniques so that costly and sometimes ineffective methods have to be employed (Stephensen *et al.* 1981). For example, acquiring permits for the controlled use of approved herbicides on NPS lands is a very lengthy and sometimes impossible process. On the other hand, budgetary and manpower constraints often limit the extent of mechanical or labor-intensive methods. Each of the areas discussed here is surrounded by agricultural lands, and hence there is a high frequency of reinvasion by exotic weeds. The result is that the cost and complexity of conducting an exotic vegetation removal program is often far greater than anticipated.

Implementing Solutions

The CPSU at the University of Idaho has, over the last 18 months, been working with the three historic sites to formulate individual vegetation management programs which include plans to control non-native species and rehabilitate selected areas. The objective of these programs is the restoration of a plant community which resembles in form and structure that which existed in historical times. The first step in these programs is to attempt to gain an understanding of what the specific historic or pristine plant communities were and how they have been influenced by the history of use on the site. Historic photos, land records and soil surveys are useful in this regard. The present plant communities are then mapped and, where possible, related to site characteristics. A species list is also developed for the site. Particular attention is paid to the existence of any rare or endangered species. Finally, for specific sites, control and revegetation programs which can be easily implemented at a moderate cost are developed.

For the rehabilitation of sites within this intermountain region, the following program has been developed. The use of fire at selected times of the year, e.g., when the plants have begun to cure, but before seed set occurs, appears to be one of the most appropriate and cost-effective methods to reduce accumulated plant biomass. The release of nutrients into the soil also enhances the seed bed characteristics. Mechanically disking the seed bed and using a drill to set new seed appears to work best.

There has been considerable discussion over the types of seed to be employed in a revegetation program for grassland areas. Purists would advocate that only native species should be planted. Our experience has shown that seed sources for many of the native grasses are scarce, and their cost is prohibitive. We have, therefore, emphasized reseeding with hybrids of native grasses, because of their greater availability, high germination rates, higher vigor, and competitive abilities. The addition of small amounts of seed of selected flowering forbs will add color and variety to the grasslands. In the year following seeding, depending on catch, grass cover may not be dense enough to prevent some random establishment of annuals and perennial weeds. These can be removed by hand. The seeded area should be protected from use for the first growing season.

A program following this approach was developed for the Fort Spokane area (Gehrke *et al.* 1981). A similar program has been implemented on a small area at Whitman Mission NHS. Here, following an early fall (1981) seeding with a hybrid wheatgrass variety, the catch has been excellent, resulting in most cases in complete ground cover.

Projects on specific resource management problems in small parks require close coordination between managers and scientists. A successful solution requires an understanding by the scientist, not only of the biology of the problems, but a sensitivity to the limitations these small parks face in implementing solutions. The CPSU program can place research scientists at locations which allow close physical proximity to park areas. This, plus the fact that most CPSU scientists are agency personnel, provides the opportunity for the development of close working relationships with the parks and an understanding of their viewpoints. The units also have access to the scientific expertise of the university system; talents which can be applied as necessary to solve particular problems. In summary, we feel that this program will prove to be an efficient and effective way of helping small parks solve their resource management problems.

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Sanat K. Dhungel

Conservation Education in Nepal

We believe that plants, animals and humans are closely interlocked on the earth, and that a disturbance in one gives rise to imbalance in the other. With this in mind, the Government of Nepal has given top priority to the formation of National Parks and Wildlife Reserves for the conservation and preservation of wild fauna and flora. Nepal now has five National Parks and three Wildlife Reserves, covering an area of more than 2,000 square miles in the Himalayas, Transhimalayan zone and in the Terai area. The conservation program was launched less than a decade ago.

The protection of unique fauna and flora will remain incomplete unless it is participated in and fully realized by the people. To help accomplish this a national program utilizing conservation education was initiated in 1974, organizing various activities such as wildlife films and slide shows for various schools in Kathmandu. Pamphlets, booklets and feature articles about wildlife in popular daily papers in Nepali and in English and in magazines have been written. Also, a weekly radio program has been organized by the Forest Ministry. Many activities such as exhibitions, essays, comics, interviews, etc., have been produced in simple Nepali language in order to make the public aware of our natural resources and wildlife and the reasons why we should protect them. Occasionally, school children have been taken to the parks and reserves in order to feel, touch and learn to protect and preserve their unique natural heritage. Nepal has placed growing emphasis in the schools at all levels on nature conservation.

Equipment for Conservation Education

Since the start of the Conservation Education Program we have felt that there is a communication gap between the people and the various agencies concerned with the protection of nature, fauna and flora of Nepal. We have benefitted greatly from outside technical assistance which has brought in experts from various countries and UN agencies. These groups have helped us greatly in organizing, photography and editing work to create an ideal conservation education section. This program has required various essential personnel and equipment, as listed below:

1. A good photographic lab, cameras and an experienced person to work in this line.
2. A slide cabinet with plenty of slides (at least 5000) and a trained person to write scripts and present slide shows.
3. One 16 mm projector, with wildlife films from Nepal and from outside (e.g., we have eight programs filmed in East Africa and five filmed in Nepal), a screen, and a Honda generator.
4. One Toyota pickup truck was modified with equipment for long distance travel.
5. Substantial budget.
6. Regular articles in Nepali and English in the country's largest papers, the *Gorkhapatra* and the *Rising Nepal*, news release twice a month, letters to the editor on wildlife conservation. One man is devoted to this work.
7. Recently, a monthly bulletin covering new developments in various Parks and Reserves and research has been issued by the Department of Wildlife. Distribution is limited to other ministries, high officials and foreign agency offices (e.g., FAO, UNDP, UNESCO) to keep them informed about what's going on in the field of wildlife conservation in Nepal.

A Peace Corps volunteer explains a booklet about Nepal's wildlife to a young resident of the Langtang National Park vicinity.

Films and Slide Shows

Films on wildlife are shown at least twice a week in various schools, colleges, and other institutions in Kathmandu. We also loaned 16 mm. films to various organizations within the country. Films and audiovisual equipment are taken once a year to the Terai Parks and Reserves, and shown in villages. This author used to handle this program in the past. The local village panchayat is informed of the time and place of the film (usually in the evening). We use a 16 mm Bell and Howell projector around Kathmandu Valley. In one instance, we attracted an audience of more than 300 people (old men, children and entire families). Watching a movie is a luxury in Nepal and this makes it easy to conduct the film show. We conduct the program by co-ordinating closely with the local panchayat people and the village head man. We answer questions after the film show and hand out booklets and pamphlets to the villagers.

Films are very useful and impressive in the schools around Kathmandu valley and the school teachers are very cooperative with our team. This is helping to disseminate the ideas of conservation to the younger generation. Slide shows are usually conducted in primary schools and secondary schools mainly in Kathmandu valley around the capital.

Radio Program

A weekly Radio Program for 15 minutes every morning has been organized by the Forest Ministry of HMG of Nepal. This program covers the broad aspects of nature conservation such as national parks and wildlife reserves, wildlife conservation, research, forest protection, forest management, community forestry, plantation programs, nursery techniques, seed collection techniques, soil conservation and so on. One trained person has been hired by the Forest Ministry on a monthly basis. Most of the materials are written by the experts from the respective departments—usually by the forest and wildlife technicians—in simple Nepali languages. Music is added to make it attractive for the audience.

The radio program is effective because people in even remote villages can listen and comment about it. An audience survey has not yet been done systematically. Similarly we do not have a measure of listener reaction as yet, but there has been some feedback from listeners. Some 8-10 letters, from the western hilly regions of Nepal, come each week with comments about the program. In another instance local people gave a written petition to us to establish a national park near their locality in order to attract more tourists. Local people are getting direct benefits from the operation of lodges and hotels around parks.

The overall aim of conservation education should be to change people's idea with respect to nature and to teach them how to treat the natural resources properly, so that they are not depleted in the future. To help with this the following things can be organized as a future extension plan.

1. Trips to national parks and wildlife reserves should be arranged for students and teachers, free of entrance fee, to create more interest in nature conservation and wildlife. This should be done in the districts where the parks and reserves are presently operating.

2. Regular film and slide shows in and around the villages surrounding the parks and reserves.

3. Regular lectures (at least 6 times a year) by the park wardens; seminars, essay competitions and quiz contests; wildlife photo exhibitions; these should be organized so that active participation by school students is possible on a large scale. This should be done in big cities in order to make large numbers of people aware of the situation in wildlife conservation in the country.

4. Regular programs especially in wildlife conservation, parks and reserves, at least once a week on radio in simple Nepali language should be arranged in order to acquaint the people with the principles of wildlife conservation.

5. Lecturers in local villages in and around the parks should discuss why parks and reserves are beneficial in the long run to the people surrounding the park, and also to those living in distant cities.

Public participation is important to preserve and enhance our National Parks and Wildlife Reserves. We recognize the importance of future generations, and are optimistic about the permanent preservation of representative samples of various ecosystems in Nepal.

Sanat K. Dhungel is currently Principal Investigator for the Smithsonian Tiger Ecology project in Nepal. Previously he served as a National Parks and Wildlife Conservation officer in Kathmandu, and worked in other conservation activities in Nepal.

An audience at a film presentation in a village 8 miles from Kathmandu.

PARK TECHNIQUES

Audiovisual Techniques for Conservation

Mark N. Boulton

It has become increasingly evident in recent years that the achievement of conservation objectives is, to a large degree, dependent on public opinion and support. Conservation education is thus clearly an essential element in all conservation programs. The purpose of this article is to survey the ever-increasing and often expensive array of audiovisual techniques available to those working in the fields of conservation education, information, or park interpretation — especially in developing countries. It does not set out to be a comprehensive instruction manual but rather to review the bewildering variety of aids and equipment, to explain the principles underlying their use, and some of the criteria upon which selection of the techniques and options should be based.

What is Audiovisual?

In general terms, any means of communication which appeals simultaneous to the senses of both sight and sound can be described as 'audiovisual.' Thus, in their simplest form, audiovisuals may be no more than the combination of the 'live' voice of a lecturer with the traditional school blackboard. More usually however, it is taken to refer to the wide range of modern technical equipment, including filmstrip and slide projectors (often linked to tape or cassette recorders), movie or cine projectors, and a variety of modern 'video' techniques.

Why Audiovisual?

Research on the effectiveness of information transfer suggests that the average student remembers less than 10 percent of what he reads, about 20 percent of what he hears, and about 30 percent of what he sees. However, the combination of sight and sound together increases retention to more than 50 percent and subsequent discussion can raise this still higher to 70 percent. Since audiovisual by definition utilizes both sound and sight (vision) its potential for use in the conservation education process is clearly evident. Having made this generalization however, the choice of equipment and techniques ultimately depends on a wide range of factors including the availability and cost of equipment, the nature and size of the audience, and the skills of the presenter. For convenience, AV techniques can be considered in three fairly distinct categories: 1. Simple equipment not involving projection; 2. Equipment for projecting still images, and 3. Equipment for projecting moving images.

Simple Equipment Not Involving Projection

Not all AV aids require complicated and expensive equipment. Many of the simpler devices outlined below can be created from simple materials at relatively low cost yet in the hands of a skilled operator can be extremely effective.

Best known of the non-projected aids is the CHALKBOARD—usually wooden (but occasionally canvas) and painted matt black or green, on which the lecturer writes with white or coloured chalk. Chalk boards are very dependent on the skills of the user and are dusty and difficult to keep clean.

Rather better are MARKERBOARDS which usually have a white plastic surface on which the operator writes with special felt-tip markers. Though they still rely on the talent of the lecturer, they are cleaner in use and accept a great variety of colours.

To avoid the need to wipe off images during a lecture, some users prefer FLIPBOARDS — a dozen or more large sheets of drawing paper clipped to a backing board. Such aids can be prepared in advance and carefully arranged in order and the lecturer merely 'flips' over each sheet as required. A series of other boards allow for the attachment of prepared display material — drawings, photos etc.

The FLANNELBOARD is covered by a rough cloth material (usually flanellette) and

Petrol driven portable generator

relies on the fact that shapes cut out of similar cloth will adhere to the covering of the main board.

The MAGNETICBOARD is usually made of mild steel covered with plastic and uses small flat magnets to attach display materials whilst the PLASTIGRAPH relies on the principle that thin plastic sheeting tends to adhere to a smooth shiny surface. It is possible to make up display boards with several of these functions and such MULTIPURPOSE BOARDS are actually sold by some manufacturers.

In essence then, non-projected aids are relatively cheap to purchase or quite easy to make, but their efficiency is very dependent on the abilities of the user. They are perhaps best suited for traditional 'educational' use in the classroom situation though they are also ideal for use in training/extension situations involving small numbers of people.

A great variety of equipment exists for the projection of still and moving images but for all there is one prime fundamental requirement — an electric power source. Almost all such equipment is designed to operate from a 'mains' source and is usually switchable to enable it to cope with 220-240 volts (mains voltage in Europe) as well as 110-120 volts (typical of USA). In the absence of a mains supply, as is frequently the case in field situations in developing countries, some alternative source of power is required.

Many Government Information Units utilize a VEHICLE GENERATOR — that found operating from the centre power take-off in Land Rovers being a typical example. Though capable of fairly high power outputs, these are very specialized pieces of equipment usually built into the vehicle during manufacture and they tend to be expensive to run. More economical and, in the case of the smaller unit, more portable, are the small PETROL DRIVEN PORTABLE GENERATORS. These will often produce a range of voltage outputs, can be carried easily by one person, and run for several hours on 5 litres of fuel. It is also possible to obtain INVERTERS which will boost the 12 volts from a car battery to the higher voltage required by most projectors, but these are rather expensive and not all that efficient. One or two manufacturers adapt their slide projectors to run directly from a 12 volt battery and a few operate (for very short lengths of time) on ordinary torch batteries. One even makes a slide projector which runs on kerosene!

Given then a power source of some description, one needs to consider whether still or moving images are most appropriate.

Equipment for Projecting Still Images

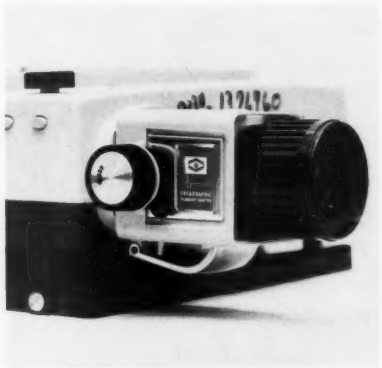
A great number of devices exist for projecting still images but some are of little more than academic interest for the purposes of conservation education. The EPISCOPE is a rather cumbersome piece of equipment which is able to project images from books, photos and other opaque originals such as maps. Since it works on the principle of reflected light, the episcope requires a powerful lamp source for even a modest light output on the screen — and a darkened room is essential.

Of greater interest, especially for training purposes, is the OVERHEAD PROJECTOR which projects large (25 cm x 25 cm) transparencies over short distances. In addition to commercially prepared OHP transparencies, the operator is able to make his own or to write on acetate film mounted on two rollers whilst sitting at a desk facing his students (rather than turning his back as in the usual 'blackboard' situation.) Particularly useful is the possibility of building upon information already on the screen by adding new 'overlays' one by one. The overhead projector can be used without black-out, and in the hands of an experienced user is cleaner, more flexible and probably more effective than a chalkboard.

Of much greater significance for conservation extension work are filmstrip and slide projectors.

The FILMSTRIP PROJECTOR is used to project a series of images printed on a continuous length of 35 mm film. These images may be full-frame (i.e. the same size as an ordinary 35 mm slide — 36 x 24 mm) or half-frame (24 x 18 mm), the film being wound from one spool to another between two spring-loaded glass plates located in front of a strong light source. In most filmstrip projectors the film is advanced by hand, but fully automatic versions are available fitted with a cassette mechanism which both provides the sound and controls the advance of the pictures. Filmstrip projectors are widely used for educational purposes since they are easy to operate and the filmstrips are relatively inexpensive and take up minimal storage space. Although individual pictures cannot be lost or placed in the wrong order, filmstrips are less flexible in use than 35 mm slides.

SLIDE PROJECTORS which project individual 35 mm slides allow for regular updating of program material, easy alteration of the sequence of pictures and have several significant advantages over filmstrip projectors. The simpler models are inexpensive and project large, clear, bright images — especially when full black-out is available. This equipment, above all others, enables the user to prepare his own AV programs for particular purposes or special target audiences. He can draw on the wide range of 35 mm slides available commercially and needs only limited skills to shoot his own material with one of the relatively inexpensive cameras now available. Developed from the old 'magic lantern,' a typical slide projector is little



Filmstrip adaptor on carousel projector

Episcope or opaque projector

Overhead projector

Slide projector

more than a bright light source (most now use the powerful quartz halogen lamps), a simple (condenser) lens to provide even illumination of the slide and a projection lens. In the simplest models the slides are placed in the machine individually by the operator—a rather time consuming business and somewhat distracting if the operator is trying to talk at the same time.

Most modern projectors are 'magazine loading,' enabling 36 or more slides to be placed in a straight plastic tray, or 80 plus in a rotary one. Thus an entire program can be planned in advance and loaded into trays which may serve for storage too. Most magazine loading projectors can be operated from a distance by means of a long extension lead linked to a hand control which may also have remote focusing facilities.

The more expensive modern 35 mm projectors may be controlled automatically by tape or cassette recorders. Typical SLIDE-TAPE UNITS comprise a cassette mechanism linked to an amplifier (which often doubles as a public address system) and an electronic device which responds to inaudible 'cue' signals on the tape. Whilst there is still a wide range of models and systems, the most widely used system carries the signal on track 4 of an international compact cassette; the pre-recorded commentary being recorded on tracks 1 and 2. More complex slide-tape units are able to control two or more projectors and the images are 'cross-faded' from one projector to the next. This not only produces a smoother presentation (there being no dark interval between the slide changes) but also enables special effects to be achieved. Even more sophisticated control units (often computer based) allow for the preparation of multi-screen/multi-image presentations often involving a large number of projectors.

All in all, the writer believes that the combination of a good 35 mm slide projector, a suitable sound system which links with it, and a skilled presenter comprise an extremely effective means of communicating conservation to large numbers of people.

Equipment for Projecting Moving Images

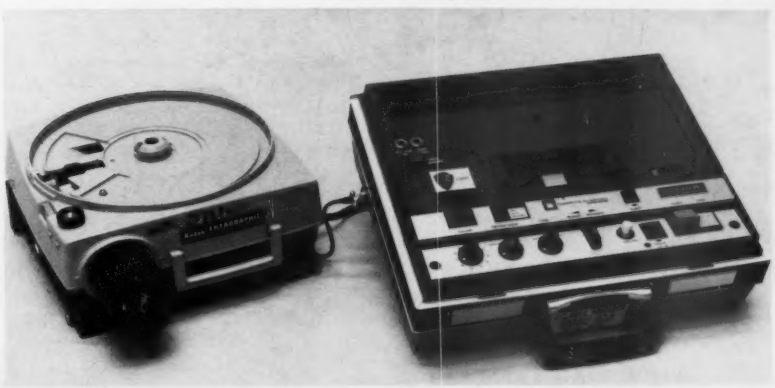
The movie or cine projector was invented over a century ago and is, of course, in widespread use in the cinema entertainment business. In principle, movement is achieved by running a series of pictures called 'frames' (each slightly different from the preceding one) across a light beam 18 to 24 times every second. Most films also carry sound on an 'optical' sound track or on a narrow strip of magnetic tape on the edge of the film.

The 16 mm PROJECTOR is the most widely used motion picture equipment for training and education purposes (in contrast to those using 35 or even 70 mm film in the cinema) Current models are more compact and lighter in weight than their predecessors and have very powerful quartz halogen lamps which allow them to project bright images of up to 2 metres or more in width. Such projectors are usually self-threading. This greatly simplifies matters for the operator who simply inserts the end of the film into a slot, the machine completing the task of threading the film automatically.

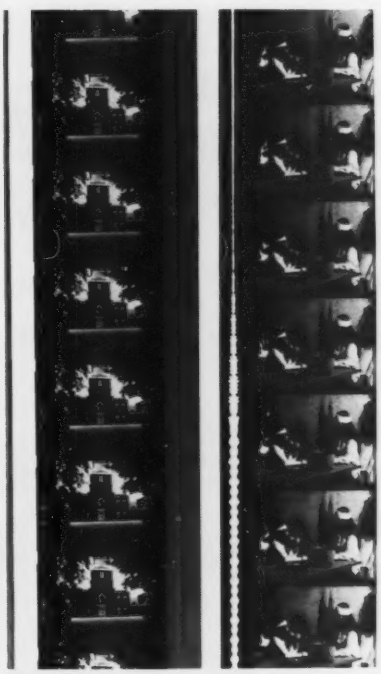
Most modern films carry an OPTICAL SOUND TRACK and are suitable for standard projectors. Experience has shown, however, that projectors equipped with record and playback facilities for MAGNETIC SOUND are particularly useful for conservation use. The reasons are two-fold. In the first place researchers and keen amateur wildlife filmmakers often shoot 16mm film on a 'one-off' basis (though, of course, copies can be made from this original material). These are often used for education/information work and it is quite possible for a film lab to add a plain magnetic strip on which a simple narration can subsequently be recorded (in just the same way as recording a tape or cassette). Secondly, conservation films are frequently available which have excellent visuals but a narration entirely unsuited (or unintelligible) to the audience in question. In such cases the laboratory can prepare further copies of the film, replacing the optical sound track with a blank magnetic strip, or may even be able to add a strip to an existing copy (though there is usually some loss of sound quality). Co-operation with a local radio station is often an effective way of recording a new narration—perhaps in a local language or dialect. In the absence of magnetic recording facilities a skilled operator can, of course, turn off the optical sound and use the public address facility (usually present) to give a 'live' commentary. Operation of modern 16 mm projectors is quite straightforward, but care should be taken to read the operation manual thoroughly and attention should be given to regular cleaning of the film gate (to prevent dust and hairs scratching the film) and also the lens and sound head.

Over the past decade, a new generation of much smaller and cheaper projectors has been developed using film approximately half the width of the 16 mm version. Though largely

16 mm film projector



Slide tape unit



Sound tracks on motion picture film: magnetic sound track on the left, optical sound track on the right

introduced for the amateur market, a very wide range of extremely sophisticated camera and projection equipment is now available. Most modern equipment is designed for the Kodak 'Super 8' format whose large picture area has tended to replace earlier 8 mm stocks. It is noteworthy that raw filmstock is now available with a built-in magnetic strip to be used with the many new cameras which have sound recording facilities as standard. Developments in the projector field also allow for the projection of a continuous film 'loop' (housed in a special cassette) which operates automatically and may do so continually. Some readers may well have come across the special version of this equipment which is now installed to entertain the passengers in Jumbo Jets!

Film projectors, usually the traditional 16 mm format, are standard equipment in almost all Government Film Units which certainly attract large enthusiastic audiences. They are certainly a very effective means of communication as the popularity of conservation films on the television network indicates, but in the last resort it is the content of the film not the nature of the projector which will spell success and in many developing countries very few suitable 16 mm films are available.

For the sake of comprehensive coverage, mention must be made of the various types of ELECTRONIC EQUIPMENT now available. One of the fastest developing communication media today is the VIDEO TAPE RECORDER (VTR) — a recording machine with additional recording and playback heads which allow the electronic recording of a television picture as well as the sound commentary. Used with a special camera, VTRs can be used for location work enabling the recorded video 'tape' to be played back immediately through an ordinary TV set. From the conservation standpoint, such equipment is of great interest for training purposes, but apart from the relatively high cost, there are certain disadvantages. There are several different systems which are incompatible, the audience size is normally limited to the number of people who can crowd around a large TV screen, and the machines are rather susceptable to dust, humidity and mechanical damage. Modern developments include the VIDEO CASSETTE RECORDER (VCR) where the tape is carried in a special cassette, and the VIDEO DISC SYSTEM which reproduces sound and pictures from a disc rather like a long-playing record and in this case it is not possible for the user to record his own programs.

Video tape recorder

Video cassette recorder

What finally determines the choice of communication media? Leaving aside costs, which may often over-ride all other considerations, the following criteria must be considered:

1. Size of the target audience.
2. Availability of 'black-out' facilities (unless used after dark)
3. Availability of appropriate 'software' — films, slides etc.
4. Availability of relevant equipment with appropriate power supply, if required.
5. Skill of the operator/presenter.

Whatever the final choice, it is unlikely to be the only option available and the most effective conservation programs will almost certainly employ a variety of these techniques, each complementing the other. One thing is certain, the communication of the conservation message has a great deal to gain from the increasing improvements in these techniques.

Further reading

Visual Aids and Photography in Education — Michael Langford. (Focal Press, Borough Green, Seven Oaks, Kent, UK.)

Slide-tape & Dual Projection — Beaumont-Craggs. (Focal Press, Borough Green, Seven Oaks, Kent, UK.)

Focal Guide to Slide-tape — Brian Duncalf. (Focal Press, Borough Green, Seven Oaks, Kent, UK.)

Slide/Sound & Filmstrip Production — John Simon. (Focal Press, Borough Green, Seven Oaks, Kent, UK.)

Teaching by Projection — Stephen Judd. (Focal Press, Borough Green, Seven Oaks, Kent, UK.)

Planning & Producing Slide Programs (Kodak E51503)

Making & Using Sound Filmstrips — The Industrial Society, 48 Bryanston Square, London WI.

Audio-Visual Techniques for Industry — (Development & Transfer of Technology Series No. 6, UNIDO, Vienna).

Mark N. Boulton, a professional English photographer, heads the WWF/IUCN International Education Project. He has contributed several articles to PARKS in past years, drawing in part on extensive field experience in Asia and Africa.

Photos for this article were taken by Mike Wiltshire, Division of Conservation Laboratories, U.S. National Park Service's Harpers Ferry Center.

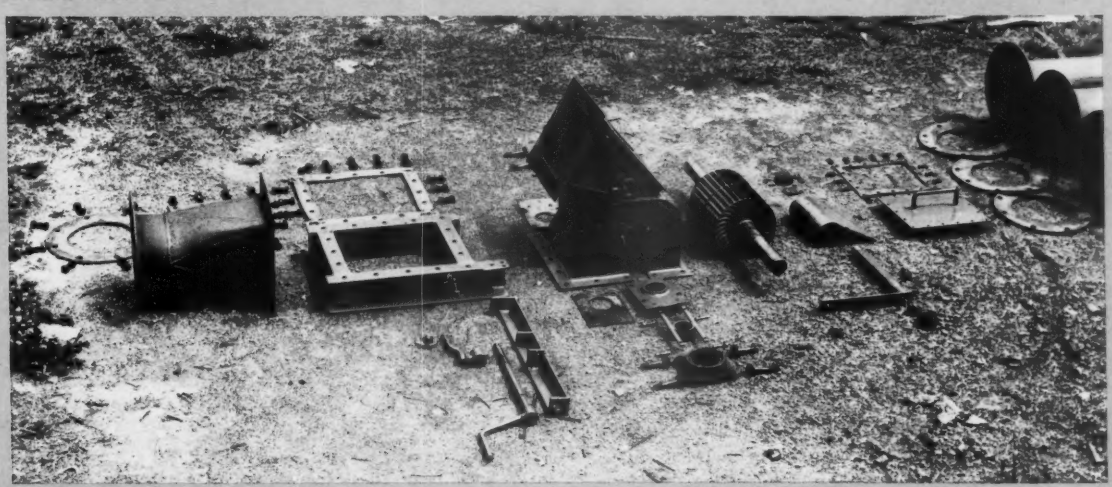
Video disc system

Small Hydroelectric Turbine

In PARKS, Volume 7, Number 1, an article by Broughton Coburn discussed alternate energy sources for Sagarmatha (Mt. Everest) National Park. Among them was a 25-Kw micro-hydroelectric facility for Namche Bazaar based on the Michell-Banki cross-flow turbine which was manufactured in Nepal under Swiss technical assistance. No photo was available at the time. Since the article was published a photo of the turbine components has been furnished.

Note the small size, which can be estimated from the hand crank in the lower center of the picture.

This turbine will provide electricity for lighting and cooking and other purposes, and it is estimated it will save one tree per day cut for firewood—a critical loss in the region of Namche Bazaar.



A System for Measuring Groundcover Changes

J.C. McBride and R.E. Leonard

A system for measuring groundcover changes, developed by Northeastern Forest Experiment Station (Forest Service, U.S. Department of Agriculture) at Durham, New Hampshire, has been used on trails of both high and low use, and conceivably could be used at backcountry campsites as well. A camera mounted on a foldable aluminum frame records the 1- x 0.5-meter plot enclosed by the rectangular base of the frame (Figure 1). The frame keeps the film plane parallel to the ground while holding the distance from camera to ground constant and minimizing vibration. Each study plot is marked by two stakes with a numbered metal tag attached to the stake on the right. The quadropod base is placed between the stakes with the metal tag on the right stake corresponding to the label on the top right hand corner of the quadropod (Figure 2). Thus, a series of photographs can record ground condition changes over time.

The stakes used to mark each study plot may remain in place over the period of the study. Other suitable systems using measuring tapes and nearby permanent objects alternatively may be used to locate the study plots precisely for the series of photos.

The camera we used was a Nikkormat with a 35 mm lens and a powerful Metz strobe flash. This flash makes lighting consistent and eliminates shadows that decrease accuracy in analysis. With Kodachrome 64 film, photos were taken with full flash at 1/125th second at f-11.

For analysis, the plots are mapped on graph paper from each projected picture. Boundaries of different cover types and individual plants are marked. The area of each cover type can be determined with a planimeter or a dot grid, and individual plants are counted by species.

The quadropod system takes less field time than grid systems and sample point transects; information is recorded and brought back to the lab for later analysis. Because analysis does not take place in the field, the field crew need not include a scientist, further reducing its cost. The photographs are a permanent record that can be referred to whenever necessary. Species diversity, composition and area coverage can be monitored at all levels of use and on a variety of vegetation types either on trails or campsites. The system's only limitation is that the height of the vegetation should not exceed 45 cm.

The aluminum frame folds for easy packing on the trail. With the quadropod base, which does not fold, the frame package measures 1 m x 0.5 m x 15 cm when packed for transport and weighs only 3 kg. This is easily managed by the field crew.

Dr. R.E. Leonard is Project Leader of the Dispersed Recreation Project at the Northeastern Forest Experiment Station, U.S. Forest Service, in Durham, New Hampshire. J.C. McBride was a Biological Aide at the time this article was prepared but she has since left the project.

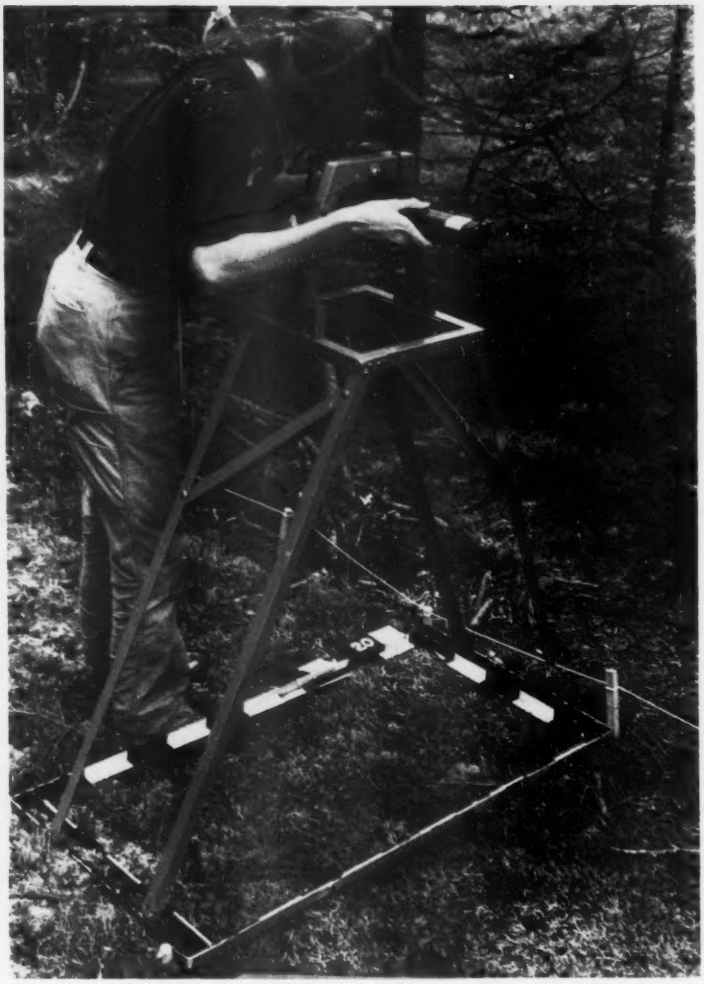
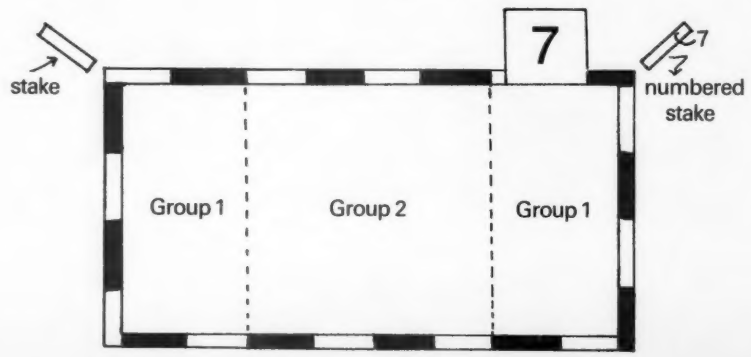


Figure 1. A camera mounted on a movable aluminum frame records ground cover data within the 1 x 0.5-meter plot. Each plot is numbered and carefully located with metal stakes which stay in place over the life of the study period, or with other reference measurements, to permit a series of photos of precisely the same area. Ground cover changes can thus be determined.

Figure 2. Quadropod plots in our study were divided into two areas of impact: Group 1 consisted of the outside portions of the plot. Group 2 was the center portion, or zone of direct trampling stress.



BOOKS AND NOTICES

Planning National Parks for Ecodevelopment — Methods and Case Studies from Latin America. 1982 (English edition). Kenton R. Miller. Center for Strategic Wildland Management Studies, University of Michigan, Ann Arbor, Michigan 48109-USA. 625 pp, spiral bound, illustrated. U.S. $39.50, including postage.

Dr. Kenton Miller, associate professor at the University of Michigan's School of Natural Resources, and Chairman of the Commission on National Parks and Protected Areas of the International Union for Conservation of Nature and Natural Resources, produced, in 1980, a book in Spanish entitled "Planificación de Parques Nacionales para el Ecodesarrollo en América Latína" (Published in Madrid in 1980 by Fundación para la Ecologia y la Protección del Medio Ambiente-FEPMA). This book was a very special event for the national parks world movement and, in particular, for the Latin American and Caribbean efforts to protect representative samples of their territories, and to manage them in the best possible way.

The book was initially drafted in English and thereafter translated into Spanish for publication. That was a very "hidalgo" (noble and courteous) behavior of the author which, in this way, made a special deference to the continent where he has had most of his field experience.

Now, it is offered to the large English-language audience in its original English version. That obviously will ensure the accuracy of the message.

Kenton Miller's book offers one of the first statements on the management of natural areas in relation to a modern and dynamic version of ecodevelopment. It sets out clearly the fundamental role that national parks and other protected areas have in regional and national development. He shows with well selected examples and case studies the alternatives, strategies, and tactics that are available in order to integrate conservation planning within the overall planning and development objectives of countries.

The book reviews the evolution and current state of Latin America's and the Caribbean's national parks and other categories of protected areas. It stresses the problems of management, human and institutional capacity, and most importantly, it provides simple and practical guidelines for the planning of these areas. It demonstrates how the African conservation experience relates to Latin America. It also broadly deals with technical and financial assistance in relation to international organizations as well as their regional and global efforts. A broad range of professionals and technicians who work directly in national parks and protected areas as well as a wide range of university students will find this book essential reading.—*Dr. Marc Dourojeanni R., Depto. de Manejo Forestal, Universidad Nacional Agraria, La Molina, Apartado 456, Lima, Peru.*

The Application of Landsat Data to Tropical Forest Surveys. 1980. R. Baltaxe, FAO-Rome. Photos, figures, charts and bibliography, 122 p.

This study, available in English, French and Spanish, tries to make a realistic assessment of the extent to which Landsat data can be used for a survey of forest areas in the tropics. The goal is to provide forestry personnel without prior experience in Landsat data with enough information either to make judgments themselves, or at least to ask knowledgeable questions, about whether it would be useful in making a needed survey in their area.

Since neither the numerical data — in the form of digital spectral radiance numbers—nor its analogue presentations permit the direct recognition of objects on the ground, except at a relatively elementary level, interpretation must be made in two separate steps: first, detection of variations in the data, or "feature separation;" and second, identification of these features using other information sources besides Landsat. Chapter three treats the first of these steps, showing how various data forms can be characterized and processed. Chapter four emphasizes operational procedures.

There follow descriptions of a series of applications of Landsat data to the survey of forest, plantations and related land use and vegetation types in the tropics, demonstrating the wide range of uses to which Landsat has been put as well as the variety of methods which have been employed and the results obtained. These examples are also used to illustrate the significance of data characteristics and of the procedures and methods discussed in Chapters three and four.

A fairly comprehensive overview is provided of available experience concerning the possibility and limitations of Landsat data for tropical forest surveys as a function of the type of data and the interpretation techniques used and of the nature of the forests surveyed. The final chapter reviews the main considerations to be taken into account for assessing the feasibility of using Landsat data for tropical forest surveys and for the execution of such surveys. — Reprinted from *Unasylva* Vol. 34, No. 135 (1982)

Respectful Rehabilitation: Answers to Your Questions About Old Buildings 192 pp., illus., biblio., append., index $9.95 paperbound. Individuals may purchase copies from: Preservation Shops, 1600 H Street, N.W., Washington, D.C. 20006. Add $2.50 postage and handling.

For anyone who has ever wondered what sandblasting does to old brick, whether original clapboard siding should be replaced with aluminum or how broken wooden or metal decoration can be reconstructed, a practical new book just published by the Preservation Press answers these and 150 other questions about how to rehabilitate an old or historic building. *Respectful Rehabilitation* takes a unique approach to the subject of rehabilitating old buildings by answering the questions that owners and residents of historic property are asking today about how to preserve carefully — repectfully — the special features of old buildings. *Respectful Rehabilitation* provides authoritative answers prepared for the National Trust for Historic Preservation by the Technical Preservation Services Branch, NPS, of the U.S. Department of the Interior, the key federal preservation agency. The answers are based on the Secretary of the Interior's Standards for Rehabilitation and are organized according to the department's detailed guidelines. The questions and answers are nontechnical and easy to understand but reflect the most responsible rehabilitation procedures.

Winter — Recreation and Interpretation. 1981. John S. Marsh, ed. Proceedings of a workshop at Stony Lake, Ontario. Ontario Section, Interpretation Canada. 165 pp, CN$6.00 including mailing.

This is an inexpensively prepared book (8½ x 11 inches) but full of information and guidance

for anyone dealing with winter visitors to parks or other protected areas, or who is interested in encouraging such usage. It contains seven sections which reveal the scope of the workshop: *The Scope of Winter Interpretation; People in Winter; Winter: Characteristics, Appreciation and Interpretation; School Programmes in Winter; Management and Planning Issues; Literary and Film Resources;* and *Appendices.*

The range of individual topics is broad and the treatment authoritative. Canada, after all, is a country that has had a great deal of successful experience with both visitors and winter.

The book may be ordered from the editor, Professor Marsh, Environmental and Resource Studies, Trent University, Peterborough, Ontario, Canada K9J 7B8.

The Light Impressions Review: A quarterly publication from Light Impressions Corporation, a company specializing in photography, conservation, and the visual arts. The publication includes articles on newsmakers in the photography field and up-to-date information relating to photographic conservation and archival materials. A *one-time* fee of $10 ($20 outside the U.S.) enrolls you as a member in the Light Impressions Updating Service and entitles you to receive *The Light Impressions Review,* the annual Light Impressions Catalog (archival supplies and photography books — a $2.00 value), and notices of special sales. To receive this informative newsletter and become a member of the Updating Service, write to: Light Impressions Corporation, 439 Monroe Avenue, P.O. Box 940, Rochester, NY 14603.

CNPPA Holds 20th Working Session at Waterton-Glacier

From 18 to 25 June, the 20th Working Session of CNPPA met in Waterton-Glacier International Peace Park, on the border of Canada and the USA. Concentrating on matters affecting the Nearctic Realm, the working session revised the UN List of National Parks and Protected Areas for North America, reviewed preparations for the World National Parks Congress, reviewed draft slide programs prepared for the Congress, revised the World Heritage Indicative Inventory for North America, visited the Head-Smashed-in Bison Jump World Heritage Site; and participated in a larger meeting dealing with biosphere reserves.

1983 Calendar Note

Many countries feature their marvelously scenic areas in annual calendars for public use. There is now a new contribution from the USA: The National Park 1983 Calendar published by Eastern National Park & Monument Association. It features 14 splendid color photographs of U.S. National Park areas by David Muench, one of the top U.S. photographers.

This 9 x 12-inch calendar is available for U.S. $7.50 (including postage and handling) from the publisher, Eastern National, 339 Walnut Street, Philadelphia, PA 19106-USA.

Signup for 1983 Parks Seminar Ends March 30

The 17th International Seminar on National Parks and Equivalent Reserves, cosponsored by the U.S. National Park Service, The University of Michigan, and Parks Canada will be held July 31 to August 30, 1983. The itinerary will include visits to parks and other protected areas in southwestern Canada and the western United States, including Hawaii. The purpose of the Seminar is to examine policies, administration, planning and other aspects of management of national parks and equivalent reserves. The primary emphasis will focus on natural areas with secondary emphasis on cultural resources. The Seminar is offered in the *English* language only. The registration and tuition fees, materials, meals and lodging, and Seminar travel will cost US$2,900. Additional personal expenses as well as travel to and from the Seminar are not included in this figure.

Enrollment in the Seminar must be limited to 36 participants. Only those applications received by March 30, 1983 will be considered by the selection committee. All inquiries and applications should be directed by airmail or telegraph to: Tom D. Thomas, Director
International Seminar on National Parks and Equivalent Reserves
School of Natural Resources
The University of Michigan
Ann Arbor, Michigan 48109, USA
Telephone: (313) 763-4029

1983 International Workshop on Environmental Interpretation

The Second International Workshop on Environmental Interpretation, sponsored by the U.S. National Park Service, will be held at the Stephen T. Mather Training Center in Harpers Ferry, West Virginia (about 70 miles from Washington, D.C.) September 12-23, 1983. Field visits will be made to nearby areas administered by the National Park Service. The purpose of the Workshop is to provide wildland managers with an introduction to environmental interpretation consisting of both concepts and practical information which can be adapted for use in the parks and protected areas of their respective countries. The Workshop is offered in the *Spanish* language only. Fees, materials, meals and lodging, and Workshop travel will cost approximately US$1,000. Additional personal expenses as well as travel to and from the Workshop are not included in this figure.

Enrollment in the Workshop must be limited to 15 participants. Only those applications received by May 1, 1983 will be considered by the selection committee. All inquiries and applications should be directed by airmail or telegraph to: Dr. G.B. Wetterberg, Coordinator
International Workshop on Environmental Interpretation
International Affairs
National Park Service USDI
Washington, D.C. 20240, USA
Telephone: (202) 523-0150

Mangrove Ecosystems AV Program Now Available

"Understanding Mangrove Ecosystems" is an audio-visual presentation comprising 60 color slides, an illustrated script, and a pre-recorded cassette. Written by Larry Hamilton, from IUCN's Commission on Ecology, this program explains the ecology of mangrove ecosystems and their importance to man. It describes many of the threats facing the world's mangroves and suggests ways in which careful management could allow them to become an important renewable resource for the future.

The program provides an ideal way of communicating the importance of mangrove ecosystems to decision makers, planners, resource managers and students.

The presentation can be ordered from IUCN/WWF International Education Project, Greenfield House, Guiting Power, Gloucestershire, GL54 5TZ, United Kingdom. Enclose a check for £15 payable to IUCN/WWF Education Project. This includes the cost of the program plus airmail and bank charges.

6th Wildlife Film Festival Set for February, 1983

The University of Montana Student Chapter of The Wildlife Society will sponsor the Sixth Annual International Wildlife Film Festival in late winter of 1983. The Festival is designed to encourage film makers to produce better wildlife films, both in technical quality and content. Such films are essential in teaching ecological and environmental concepts to the public. These films may be the only contact many people have with wildlife, and so the messages they convey are critical.

The deadline for submission of applicatons and films is February 4, 1983. Please note that this is *earlier* than deadlines for past Festivals. All entries must have a predominantly wildlife theme and have been produced or released during calendar year 1982. Judging will be held prior to the Festival. Winning entries will receive certificates and the results will be internationally publicized.

The winning films will be shown to the public on February 25, 26, & 27, 1983, at the University of Montana campus in Missoula. Panels and workshops of film makers and biologists will also be a feature during this weekend.

Information, rules of eligibility, application forms, and the Festival agenda can be obtained by writing or calling:

Wildlife Film Festival
Wildlife Biology Program
University of Montana
Missoula, Montana 59812
(406) 243-5272

PARK VIEWPOINT

Toward a Dynamic Balance of Man and Nature—The Need for New Life Styles

Raymond F. Dasmann

During the past few decades people have been encouraged to look to their nation's capital, or worse yet, to the United Nations, for solutions to problems that had always been considered, in the past, to be local affairs. But the tendency to depend upon the national government for decisions on the management of local resources inevitably creates delay, confusion, and often ends up with the wrong solution for each local community through trying to reach the right solution for all. *Thus providing water for a nation's population–as viewed from the top, can mean the need to build giant dams and canal systems, costing hundreds of millions of dollars, and taking many years. At the local level providing water may mean only developing some roof-top collectors, storage tanks, and giving some attention to the management of vegetation on the local hills and valleys.* It might take a little money, some labor, and a few months of effort to improve the situation. But who will make that local effort if the responsibility lies with the government, and particularly if the government is likely to override such a local initiative? Similarly, the *provision of electricity, viewed from the top, may seem to require the installation of a massive, high-risk nuclear plant, and an environmentally disruptive national grid of power lines. It could also mean, at the local level, the installation of a windmill, or a small stream diversion through an axial flow generator.*

If we attempt to conserve nature at a national level, we pass a great number of protective laws and hire people to enforce them. We establish a number of protected areas, and hire people to patrol and manage them. Decisions on protection, management, and administration are made by experts in the capital. Agencies come into existence with administrators who rarely have time to visit the field. We know the results, they are all around us. For each new protective law, we develop new specialists in the circumvention of that law, greater in number than the law enforcement agents. For each area in a national park or reserve, a larger area outside is degraded or made less productive. Or so it has seemed to go.

In some earlier papers I have promoted the idea that *human societies can be divided into two categories, with some in transition from one to the other. These are ecosystem people and biosphere people.*

Ecosystem people are those who depend almost entirely upon a local ecosystem, or a few closely related ecosystems. Virtually all of the foods they eat, or the materials they use, come from that ecosystem—although there will be some limited trade with other ecosystem groups. Because of their total dependence on a local system, developed usually over many generations, they live in balance with it. Without this balance they would destroy it, and cease to exist, since no other resources are available. The balance is assured by religious belief and social custom—everything is geared to the rhythms of nature—to phases of the moon, changes of seasons, flowering and fruiting of plants, movements and reproduction of animals. Such people have an intricate knowledge of their environment—the uses of plants for food, fibre, medicine. Every species, every thing, in their environment has some meaning or significance. Recent studies have shown that most such people did not live impoverished lives. Instead they tended to have adequate food, good health, abundant leisure—many of the features of the good life that others today strive for and rarely achieve. Once everybody on earth was in this category. Now only a few so-called "primitive" peoples, living more or less in isolation, survive.

Biosphere people are those who can draw on the resources of many ecosystems, or the entire biosphere through networks of trade and communication. Their dependence on any one ecosystem is partial, since they can rely on others if any one fails. Drawing as they do on planetary resources they can bring great amounts of energy and materials to bear on any one ecosystem—they can devastate it, degrade it, totally destroy it and then move on. All of those who are now tied in to the global network of technological society are biosphere people. They are the people who preach conservation, but often do not practice it.

If we were to inquire when nature conservation in Africa was most effective, the answer would be "long before the words 'nature conservation' were ever spoken." Nature conservation prevailed in Africa in the days before the agents of the biosphere societies first appeared—in other words before European technological society put in its appearance. In those days everybody lived in what we now call national parks and scarcely any species of animal or plant could be called threatened. Now the global conservationists and national administrators of the biosphere culture try desperately to protect species and to establish national parks in places were ecosystem people once lived. Effective conservation is at its lowest ebb. This is called progress. In the old Africa there were decision makers in the villages. Their decisions seemed to favor conservation. Now we try to influence national planners in the capital to achieve nature conservation. But the village decision maker still decides whether or not he will kill the last leopard in his stretch of country. Something is out of balance. Can the balance be restored?

We have lived too long with the idea that there is merit in bigness—an economy of scale that is important to efficiency. We suffer from the delusion that international or national organizations are best equipped to solve all conservation and development problems. It is a delusion. Aid poured in from the top with the idea that it will filter down and benefit poor people seldom filters very far. The filters are too fine, and scarcely anything drips through. Bigness creates dependency. Economies of scale lead to sociologies of economic helplessness. This should be increasingly obvious.

Marc Dourojeanni has pointed out the trifling amount of tropical rainforest that has actually been included in effective national parks or equivalent reserves—less than 2 percent—probably not 1 percent if we were to include only those reserves that really functioned in the way that they

should. He has further noted that in Peru, if plans go through, we may see 10 percent of the rainforest protected. In other words, at the culmination of an impressive national conservation effort, 90 percent of the tropical rainforest is still left available for forms of use that will certainly create major modifications if not destroy it completely. If this does happen, what will be the fate of the islands of rainforest left in national parks? Will they be secure? It seems unlikely. Our host country, Zaire, has an impressive array of national parks. Those listed in the UN List cover over 7 million hectares. *But nobody can really believe that conservation can be effective if we have 10 percent or less of the country in protected areas and the rest of the country is wide open to exploitation.* To be meaningful we must begin to restore conditions in which conservation will be a way of life for most people, where it will be a partner in development activities, where agriculturally productive land and natural areas are interspersed and the village forest is as important as the village field. In other words we need to restore some of the old partnership with nature that once existed throughout Africa. In the old days the partnership existed without people being aware of it. Now, with more people, we need a more conscious partnership. Some so-called "primitive" groups of people today still have it. We could all learn from them.

It is not suggested that any people be forced to live without the real benefits that technological advancement can bring: education, medical care, communications, transportation efficiency, and so on. It does mean, however, separating the gold from the dross — accepting the benefits while rejecting the energy and material wastage, the unnecessary consumption of scarce materials, all of the useless activities and societal patterns that end up with alienation of people and environmental impoverishment. What we really need is "conservation as if people mattered" and "development as if nature mattered."

To get there from here I believe we must aim at selective decentralization. Authority to solve local problems should always be held at the local level. Development should be localized, at a human scale, and intended to solve human problems. Nothing should be done by the province that can be done better by the village. Nothing should be referred to the nation that can be solved by the province. Those most likely to be directly affected by development decisions should have the most active role in reaching those decisions. No development decision should be made without full exploration of its effects upon human society and the natural environment. This does not mean that the local, the small scale, should prevail in all activities. Transportation networks need national coordination. Copper mines, smelters, refineries will require massive inputs of energy and labor — they can't be supplied by a few wind generators. Equally, however, one does not need a gigawatt power plant to meet the energy needs of farms and villages. In fact supplying energy needs in such a way inevitably creates the feeling of alienation and dependence that results when one has no understanding or control over one's means for survival.

To those nations that wish to pursue the technological development alternative, apparently offered by the past behaviour of such countries as the United States, the answer is that there is *no way* such a pathway can lead to long-term economic development. The energy and materials wasting economy of the United States should be an example to the rest of the world of what *not* to do. *There is no possibility that it can go on for very much longer, without impoverishing the world.* All of the evidence from energy analysis, materials analysis — or most particularly from the increasing alienation of people from identification with government policy and practice show that present trends cannot and will not continue. Any country that hopes to follow this example is following a path to nowhere, from which the United States must find some way back.

The development pathways that hold promise are those that make most intelligent use of locally available renewable or inexhaustible energy resources — those based on the sun and the derivatives of solar power, wind, vegetation, wastes, hydropower and the like. Using these and basing development on local, conservation-oriented land-use practices, building from indigenous knowledge and skills, each nation can find a way for improving the lot of its people — not just for a decade or two, but for the foreseeable future. Somehow the political decision makers at high levels of government and the economists who advise them must be made conscious of the need to find ecologically sustainable ways of life. That these in turn will be oriented toward nature conservation is inevitable. Unfortunately, I know no way short of serious catastrophe to persuade many national decisionmakers of the need to shift away from short-term solutions. Politicians live for the short term. So I can only suggest that the local decision makers, the people themselves, hang on to whatever they can of their traditional ways and build slowly on them to achieve economic development at their own pace, and on their own terms. Faced with the arrogance and recklessness of governments of nation states, who prefer the glamour of jousting with one another in the international arenas of power to solving the problem in their own domains — this is not much hope. But it is all there is to offer for most of the world, when political leaders prefer fighter planes to manure spreaders.

Dr. Raymond F. Dasmann is Provost, College Eight, and Chair, Environmental Studies, at University of California, Santa Cruz. Dr. Dasmann based this Viewpoint for PARKS on a paper he prepared for the 13th Technical Meeting of IUCN held at Kinshasa, Zaire, in 1975. His arguments are even more valid today than they were then. –Ed.

The modern Bali Beach Hotel at Denpasar, site of the 1982 World National Parks Congress. Sixty-eight countries were represented by more than 450 participants. Photo: Kenton R. Miller

Back cover: Magnificent frigate birds (Fregata magnificens) nest along with boobies (Sula sula) on Half Moon Caye. With a wingspan of 7 feet, the frigate bird is a powerful flier and an aggressive, destructive neighbor in the rookery it shares with the booby. Photo: Anne LaBastille

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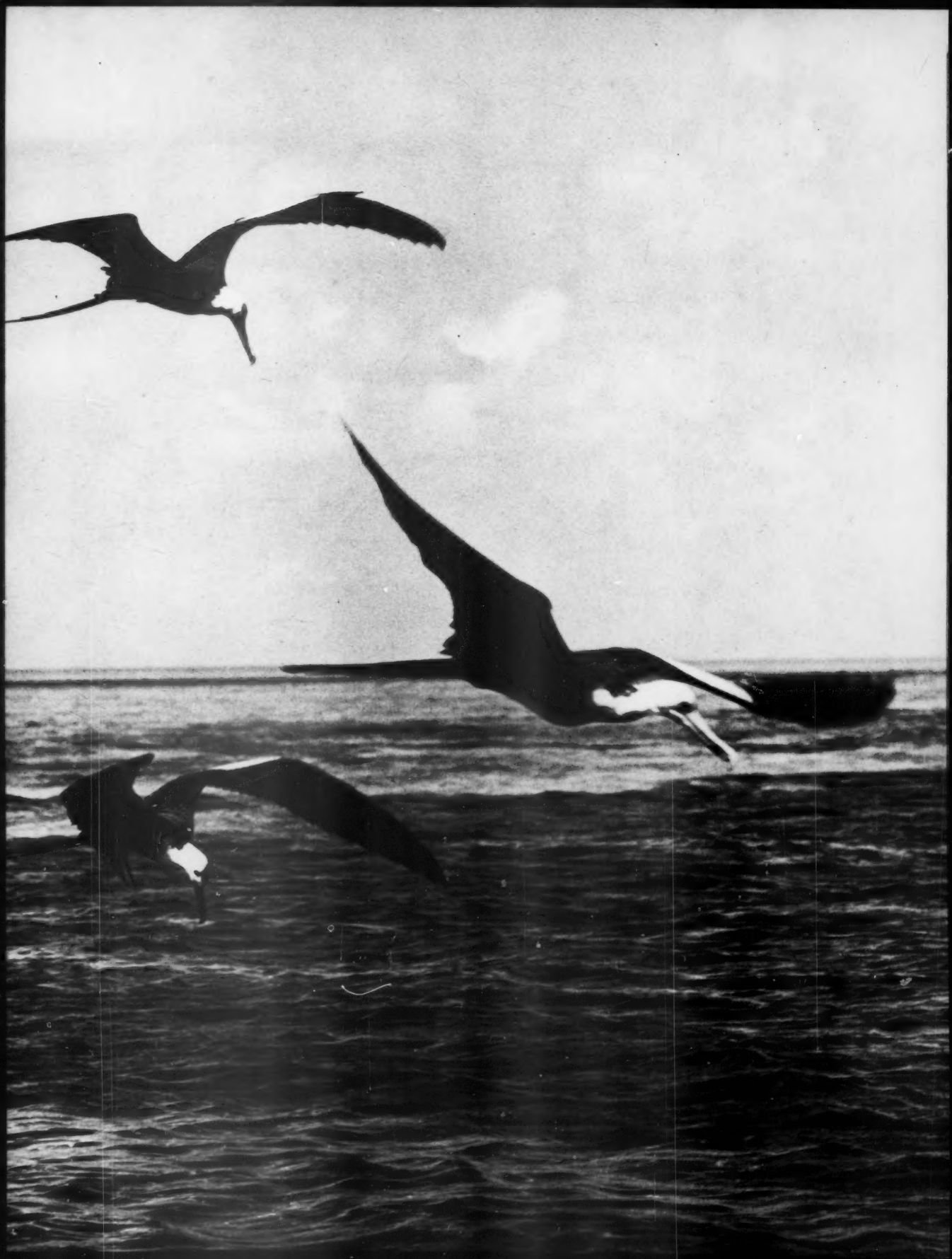
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